

ABSTRACT OF THE DISCLOSURE

A miniaturized therapeutic radiation source includes a optically driven thermionic cathode having an electron-emissive surface, and a non-planar, x-ray emissive target. A fiber optic cable directs a beam of optical radiation, having a power level sufficient to heat at least a portion of the electron-emissive surface to an electron emitting temperature, from a laser source onto the cathode. An electron beam emitted from said cathode strikes the target, positioned in the electron beam path. The target includes a thin film of x-ray emissive material, adapted to emit therapeutic radiation in response to incident accelerated electrons from the electron beam, and a support structure made of x-ray transmissive material. The target has a non-planar configuration, such as a conical shape or a hemispherical shape, designed to produce a more uniform and intense radiation pattern around the target.